

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Richard E. Smalley et al                      Art Unit : 1773  
Serial No. : 09/935,995                                      Examiner : Hoa T. Le  
Filed : August 23, 2001                                      Conf. No. : 1538  
Title : POLYMER-WRAPPED SINGLE-WALL CARBON NANOTUBES

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

DECLARATION OF KEN SMITH, PH.D., UNDER 37 C.F.R. § 1.132

Dear Sir:

1. My name is Ken Smith, Ph.D. I am the Vice President of Technology of Carbon Nanotechnologies, Inc., ("CNI"), which I co-founded with Dr. Richard Smalley. Richard Smalley, Daniel Colbert, myself and Michael O'Connell are the named co-inventors of the above-reference patent application (the "Application"). CNI has exclusively licensed the Application from Rice University. In addition, I worked at Rice University with Richard Smalley and the other inventors of the Application when we invented the invention of the Application.

2. I am familiar with and have reviewed O'Connell *et al.*, "Reversible water-solubilization of single-walled carbon nanotubes by polymer wrapping," *Chem. Phys. Lett.*, 342 (2001) 265-271 ("*O'Connell*"). While I am not an author of *O'Connell*, two of the co-inventors of the present Application (namely Michael O'Connell and Richard Smalley) were co-authors of that paper. Notwithstanding the listing of other co-authors of *O'Connell*, the named inventors on the present Application (Richard Smalley, Daniel Colbert, myself, and Michael O'Connell) is correct. And, notwithstanding the authorship of *O'Connell*, *O'Connell* discloses subject matter invented by myself and the other named co-inventors of the Application rather than subject matter derived from the other co-authors of *O'Connell*.

3. I am aware *O'Connell* states the following at 269, col. 1, Section 3.4, first full paragraph:

SWNTs can be successfully solubilized by wrapping with other polymers, including polystyrene sulfonate (PSS), poly(1-vinyl pyrrolidone-co-vinyl acetate), poly(1-vinyl pyrrolidone-coacrylic acid), poly(1-vinyl pyrrolidone-co-dimethylaminoethyl methacrylate), polyvinyl sulfate, poly(sodium styrenesulfonic acid-co-maleic acid), dextran, dextran sulfate, and bovine serum albumin. Other polymers were unsuccessful, including poly(methyl methacrylate-co-ethyl acrylate), polyvinyl alcohol, polyethylene glycol, and polyallyl amine.

4. This paragraph is consistent with what I understood (and I believed the other co-inventors understood) at the time *O'Connell* was submitted to *Chemical Physics Letters*. Namely, at that time, using the process of the Application, we had wrapped SWNTs with certain polymers, including polystyrene sulfonate (PSS), poly(1-vinyl pyrrolidone-co-vinyl acetate), poly(1-vinyl pyrrolidone-coacrylic acid), poly(1-vinyl pyrrolidone-co-dimethylaminoethyl methacrylate), polyvinyl sulfate, poly(sodium styrenesulfonic acid-co-maleic acid), dextran, dextran sulfate, and bovine serum albumin (as well as polyvinyl pyrrolidone (PVP), and such wrapped SWNTs had been successfully solubilized. Furthermore, at that time, and using the processes of the Application, we had wrapped SWNTs with other certain polymers, including poly(methyl methacrylate-co-ethyl acrylate), polyvinyl alcohol, polyethylene glycol, and polyallyl amine; however, such wrapped SWNTs were not then successfully solubilized.

5. It is incorrect to interpret the last sentence quoted above (from *O'Connell*) to mean the identified polymers of the last sentence had not been found to be successful in wrapping aggregates of SWNT and that coatings of one of poly(methyl methacrylate-co-ethyl acrylate), polyvinyl alcohol, polyethylene glycol, and polyallyl amine on aggregates of SWNT had been unsuccessful. To the contrary, and as noted above, we were able to wrap the SWNTs with poly(methyl methacrylate-co-ethyl acrylate), polyvinyl alcohol, polyethylene glycol, and polyallyl amine using the processes disclosed in the Application. (We just had not yet successfully solubilized such wrapped SWNTs).

6. After the submission *O'Connell* to *Chemical Physics Letters*, we subsequently performed tests indicating the SWNTs wrapped with polymers including poly(methyl methacrylate-co-ethyl acrylate), polyvinyl alcohol, polyethylene glycol, and

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polyallyl amine, could be successfully solubilized. We included such a statement in the Application on page 24, at lines 7-13.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are true; and further these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: December 28, 2006

By:   
Ken Smith, Ph.D.